

REMARKS/ARGUMENTS

Claims 1-17 are active.

The claimed invention provides a lubricant composition comprising:

a base oil and

at least one additive having friction-modifying properties,

wherein

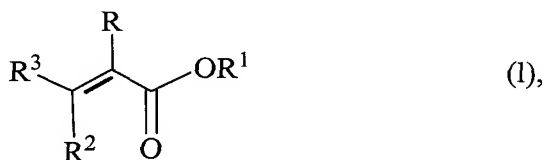
the additive having friction-modifying properties is a block copolymer comprising:

hydrophobic segments P and

polar segments D,

wherein the hydrophobic segments are obtained by polymerization of monomer compositions which comprises

a) from 0.5 to 40% by weight, based on the weight of the monomer compositions for preparing the hydrophobic segments, of one or more ethylenically unsaturated ester compounds of the formula (I):



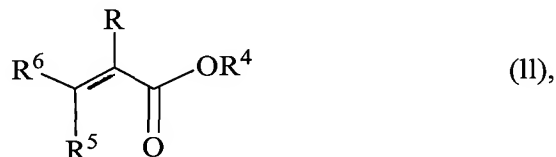
wherein

R is hydrogen or methyl,

R¹ is a linear or branched alkyl radical having from 1 to 5 carbon atoms,

R² and R³ are each independently hydrogen or a group of the formula -COOR' in which R' is hydrogen or an alkyl group having from 1 to 5 carbon atoms,

b) from 50 to 100% by weight, based on the weight of the monomer compositions for preparing the hydrophobic segments, of one or more ethylenically unsaturated ester compounds of the formula (II):



wherein

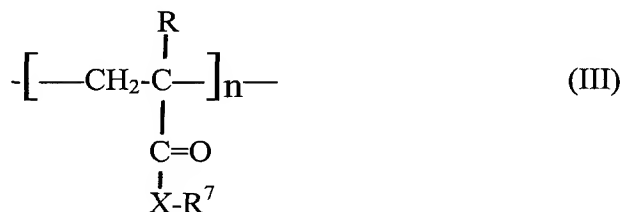
R is hydrogen or methyl,

R⁴ is a linear or branched alkyl radical having from 6 to 30 carbon atoms,

R⁵ and R⁶ are each independently hydrogen or a group of the formula –COOR'' in which R'' is hydrogen or an alkyl group having from 6 to 30 carbon atoms,

c) from 0 to 50% by weight, based on the weight of the monomer compositions for preparing the hydrophobic segments, of comonomers,

and the polar segments are represented by the formula (III):



wherein

R is independently hydrogen or methyl,

R⁷ is independently a group comprising from 2 to 1000 carbon atoms and having at least one heteroatom,

X is independently a sulfur or oxygen atom or a group of the formula NR⁸ in which

R⁸ is independently hydrogen or a group having from 1 to 20 carbon atoms, and

n is an integer greater than or equal to 3, and further

wherein a ratio of the length of the hydrophobic segments to the polar segments of the block copolymer is in the range of from 5:1 to 1:2.

The rejection of Claims 1-14 and 17 under 35 U.S.C. 103(a) over Mishra et al. (U.S. 5,834,408) in view of Pappas et al. (U.S. 3,816,314) is respectfully traversed.

Mishra describes an acrylic copolymer obtained by anionic polymerization of the following acrylic monomers:

- a) 0-60% $\text{CH}_2=\text{C}(\text{R})-\text{C}(\text{O})-\text{O}-\text{R}_1$ wherein R_1 is C_{1-5} alkyl;
- b) 0-60% $\text{CH}_2=\text{C}(\text{R})-\text{C}(\text{O})-\text{O}-\text{R}_2$ wherein R_2 is C_{6-14} alkyl; and
- c) 15-80% $\text{CH}_2=\text{C}(\text{R})-\text{C}(\text{O})-\text{O}-\text{R}_3$ wherein R_3 is C_{15-22} alkyl. (Claim 1)

At least one of a) and b) is present and the total amount of a) and b) is from 20-85 weight per cent. Other monomers may be added to the polymerization, including dialkylaminoalkylacrylamides (Col. 3, lines 20-39). However, nowhere does Mishra disclose or suggest a polymer block based on dialkylaminoalkylacrylamides nor any numerical segment length relationship of a dialkylaminoalkylacrylamide segment relative to the hydrophobic copolymer and nowhere does this reference provide any guidance regarding this relationship. In describing synthesis of the hydrophobic copolymer, Mishra states:

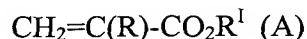
The comonomers are preferably added in one-shot (at-once) as a single amount or rapidly added as a single stream. (Col. 4, lines 37-40)

The reaction is quite fast and is normally complete within a few seconds. Conversion is also quite good in the instant process and is generally approximately 100% conversion. (Col. 4, lines 44-47)

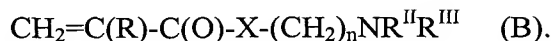
In this way, Mishra obtains a copolymer having a narrow molecular weight range having a polydispersity of 1.0 to about 2.0 (Col. 4, lines 12-16). Mishra states (Col. 4, lines 31-34):

It is preferred, for purposes of achieving the desired polydispersity for the copolymers produced in the above described process, that the comonomers be added to the polymerization reactor in a particular manner.

Pappas describes an oil additive which is an oil soluble block copolymer of a comonomer A of the formula:



and comonomer B of the formula:



In contrast to the description of Mishra, Pappas describes synthesis reaction times of 1 to 8 hours by first adding one monomer to a reaction vessel, allowing it to react to a desired extent, then adding a second monomer and reacting it (Col. 4, lines 51-68). Pappas further describes the slow or poor reactivity of the comonomer B, as follows (Col. 5, lines 20-25):

In preparing the polymers, an excess of the second comonomer B should be used over the amount of the comonomer B units desired in the polymer. It has been found that in the block copolymer, only part of the comonomer B enters the block copolymer.

Applicants respectfully submit that in view of the cited descriptions from the two references, one of skill in the art would recognize that the structure obtained by Pappas is not obtainable in the one shot or continuous rapid method required by Mishra.

Therefore, Applicants submit that modification of Mishra to include the block copolymer structure including a block of monomer B described by Pappas would require significantly longer reaction times and prevent obtaining the polydispersity value sought by Mishra.

The MPEP § 2143.01 refers to *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) in stating:

If proposed modification would render the prior art being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.

Applicants again submit that the combination of Mishra and Pappas does not disclose or suggest a block copolymer wherein a ratio of the length of the hydrophobic segments to the polar segments is in the range of from 5:1 to 1:2. Moreover as described above, inclusion of a copolymer block of a monomer B according to Pappas would likely render The copolymer unsuited for the Mishra intended use or alter its principle of operation.

Applicants again submit that the Pappas comonomer (A) is a hydrophobic monomer and comonomer B is hydrophilic. Further, whereas the claimed invention describes a ratio of the length of the hydrophobic segments to the polar segments of the block copolymer is in the range of from 5:1 to 1:2 and that because length herein means number of monomer units, the claimed ratio range can be directly converted to equivalent mole percent values of 83 (5/1) to 33 (1/2) % hydrophobic segment. Comparison of these values to those described by Pappas (99.75/0.25 to 90/10) shows that the cited secondary reference does not disclose or suggest the block copolymer of the presently claimed lubricant composition.

In view of the above, Applicants respectfully submit that the cited reference combination cannot render the claimed invention obvious. Accordingly, withdrawal of the rejection of Claims 1-14 and 17 under 35 U.S.C. 103(a) over Mishra in view of Pappas is respectfully requested.

The rejections of Claims 15 and under 35 U.S.C. 103(a) over Mishra in view of Pappas and further in view of Nesvadba et al. (U.S. 2004/0242813) and Benicewicz et al. (U.S. 2003/0060577) respectively, are respectfully traversed.

Applicants respectfully note that Claims 15 and 16 depend from Claim 1. The deficiency of the primary reference was described above.

Nesvadba is cited to show an initiator with a transferable atom group.

Nesvadba describes a process for the preparation of hydroxyl-vinyl-aromatic polymers by anionic radical polymerization (Abstract). Nowhere does this reference disclose

or suggest a block copolymer according to Claim 1 and therefore, Nesvadba cannot cure the deficiency of the primary reference.

Benicewicz is cited to show a dithiocarboxylic ester.

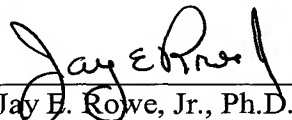
Benicewicz describes a process for preparing dithiocarboxylic esters. This secondary reference is not directed to the preparation of block copolymers according to Claim 1 of the present invention and therefore cannot cure the deficiencies of the primary reference.

In view of the above, Applicants submit that the cited combinations of references cannot render the claimed invention according to Claims 15 and/or 16 obvious and withdrawal of the rejections of Claims 15 and 16 under 35 U.S.C. 103(a) over Mishra in view of Pappas in view of Nesvadba and Benicewicz respectively, are respectfully requested.

Applicants respectfully submit that the above-identified application is now in condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

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